

## A CASE OF STYLOPIZATION IN A PANURGID BEE, LIOPEUM SUBMETALLICUM (SPINOLA)

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Although it has been known for some time that stylopization occurs in bees of the family Panurgidæ, relatively few instances have hitherto been reported. Pierce<sup>1</sup> (1904) made the following notation:

"While collecting bees about nine o'clock A. M. on Aug. 10, 1903, on the garden squash, Mr. J. C. Crawford, Jr., of West Point, Nebraska, took a species of *Panurginus*, in the body of which were two female *Xenos*, and in his collecting tube, flying frantically about, was a male *Xenos*. It had probably been in copula with one of the females when taken."

Later (1918) Pierce recognized this host as *Panurginus innuptus* Cockerell. In 1906, Friese<sup>2</sup> recorded four stylopized females of the panurgid genus *Halictoides*, collected at Innsbruck. An additional species—*Panurginus ornatipes* Cresson (*boylei* Cockerell) from Las Vegas, New Mexico—was listed by Pierce<sup>3</sup> in 1909. The number of known panurgid hosts was notably increased in 1910, when Robertson<sup>4</sup> recorded stylopization in four of his species of the genus *Pseudopanurgus*, namely, *labrosus*, *labrosiformis*, *rudbeckiæ*, and *solidaginis*—all collected at Carlville, Illinois. In 1913, Morice<sup>5</sup> reported stylopization in a female and in a male of *Panurgus cavannæ* Gribodo that he had taken in the same locality, Jericho, ten years apart.

<sup>1</sup> "Some hypermetamorphic beetles and their hymenopterous hosts," by W. Dwight Pierce. Nebraska University Studies, 1904, Vol. IV, pp. 153-190, with 2 plates and 1 text figure.

<sup>2</sup> "Über die systematische Stellung der Strepsipteren," by H. Friese. Zoologischer Anzeiger, 1906, Vol. XXIX, pp. 737-740.

<sup>3</sup> "A monographic revision of the twisted winged insects comprising the order Strepsiptera Kirby," by W. Dwight Pierce. U. S. Nat. Mus. Bulletin 66, pp. 1-232, with 15 plates and a map, published 1909.

<sup>4</sup> "Hosts of Strepsiptera," by Charles Robertson. Canadian Entomologist, 1910, Vol. XLII, pp. 323-330.

<sup>5</sup> "A note concerning certain cases of stylopisation," by F. D. Morice, Entomologist's Monthly Mag., 2nd Ser., 1913, Vol. XXIV, pp. 253-254.

"In both these cases," Morice states, "the parasite is imbedded under the 4th abd. segment of the host. The ♂ has only one of them, the ♀ has two, but in neither case is any considerable distortion of the abdomen to be noticed."

Pierce<sup>6</sup> (1918) noted under the name *Panurginus boylei* Cockerell the specimen that he had previously (1909) listed as *Panurginus ornatipes* Cresson (*boylei* Cockerell)<sup>7</sup> and added to the known panurgid hosts yet another, *Panurginus californicus* Cresson from Los Angeles County, California. Salt<sup>8</sup> (1927) was able to enrich the records by a further species, *Pseudopanurgus æthiops* Cresson, from Wray, Colorado, and to note another example in a known host, *Panurginus innuptus* Cockerell, from Minot, North Dakota.

So far as I am aware, no instance of stylopization has hitherto been reported for the panurgid genus *Liopæum*. The stylopized specimen here considered is a male from Angol, Chile, collected Dec. 7, 1929, by D. S. Bullock. The parasite is deeply imbedded between the fourth and fifth tergites of its host. Another male specimen of the same species of *Liopæum*, taken in the same locality and by the same collector but on Nov. 19, 1926, is available for comparison, as are several females.

In the stylopized specimen the maculation of the lower half of the face is drastically reduced in contrast to the full expanse of pale yellow in the normal specimen. Only a trace of yellow remains in each of the lateral angles of the clypeus, the rest of the clypeus being entirely black. The lower half of the maculations on the sides of the face have been replaced by black. The mandibles, too, are black, but the labrum and a tripartite maculation just above the clypeus show only a slightly more limited extent of yellow than in the normal specimen. The front tibiæ,

<sup>6</sup> "The comparative morphology of the order Strepsiptera, together with records and descriptions of insects," by W. Dwight Pierce. Proc. U. S. Nat. Mus., 1919, Vol. LIV, pp. 391-501, with 15 plates, 3 text figures, and map.

<sup>7</sup> Swenk and Cockerell (1907) regarded *boylei* as a subspecies of *ornatipes*. "The bees of Nebraska," by Myron H. Swenk and T. D. A. Cockerell. Entomological News, 1907, Vol. XVIII, pp. 178-187.

<sup>8</sup> "Notes on the Strepsiptera and their hymenopterous hosts," by George Salt. Psyche, 1927, Vol. XXXIV, pp. 182-192.

instead of being yellow as in the normal male, are black with merely a basal cream-colored spot, paralleling the condition of the female. The hind basitarsi are ferruginous like those of the female instead of dark as in the normal male. Another respect in which the stylopized male resembles the opposing sex rather than its own is in the presence, along the carination on the middle femora below, of a comb-like arrangement of microscopic bristles. Spinola (1851) in defining the genus *Camptopæum* (from which *Liopæum* was subsequently separated) mentions the presence of this brush or comb in the females and its absence in the males. Another peculiarity—but without parallel in normal individuals of either sex—is a dense, appressed matting of hair, similar in character and only a little less compact than the fasciæ along the apical margins of the tergites, that extends almost concealingly from base to apex over the left half (the half on which the parasite occurs) of tergites 5 and 6. The right half of tergites 5 and 6 is, as in the normal specimen, sparsely covered with erect, thin hairs. The sculpturing of the *Liopæum* seems to have been unaffected by the parasite and I have not been able to find any departure from the normal in the proportions of the segments of its antennæ, in the venation of its wings, etc.

I believe that the specimens above discussed belong to the species *Liopæum submetallicum* (Spinola) though they are perhaps to be considered a variety of that species. From Spinola's description the normal male differs scarcely at all but the females that I associate with the males have a tripartite band of yellow (much like that of the male) above the clypeus, a small cream-colored maculation at the base of the front and middle tibiæ (duplicated in the case of the first tibiæ of the stylopized male and in the case of the middle tibiæ of both the males), the scape dull orange beneath, and the fascia on tergite 1 broadly interrupted medianly.